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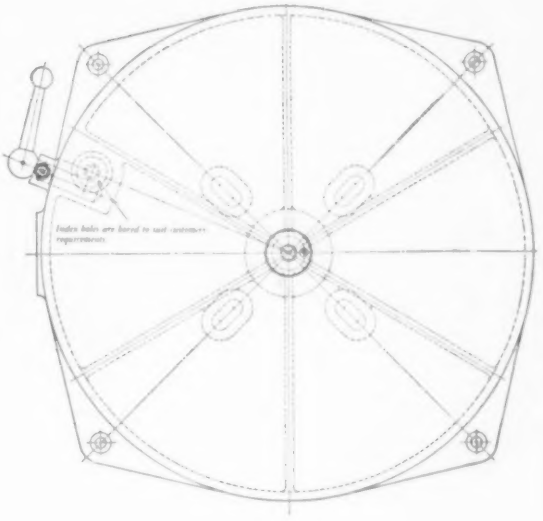

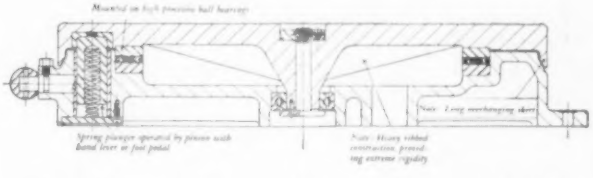

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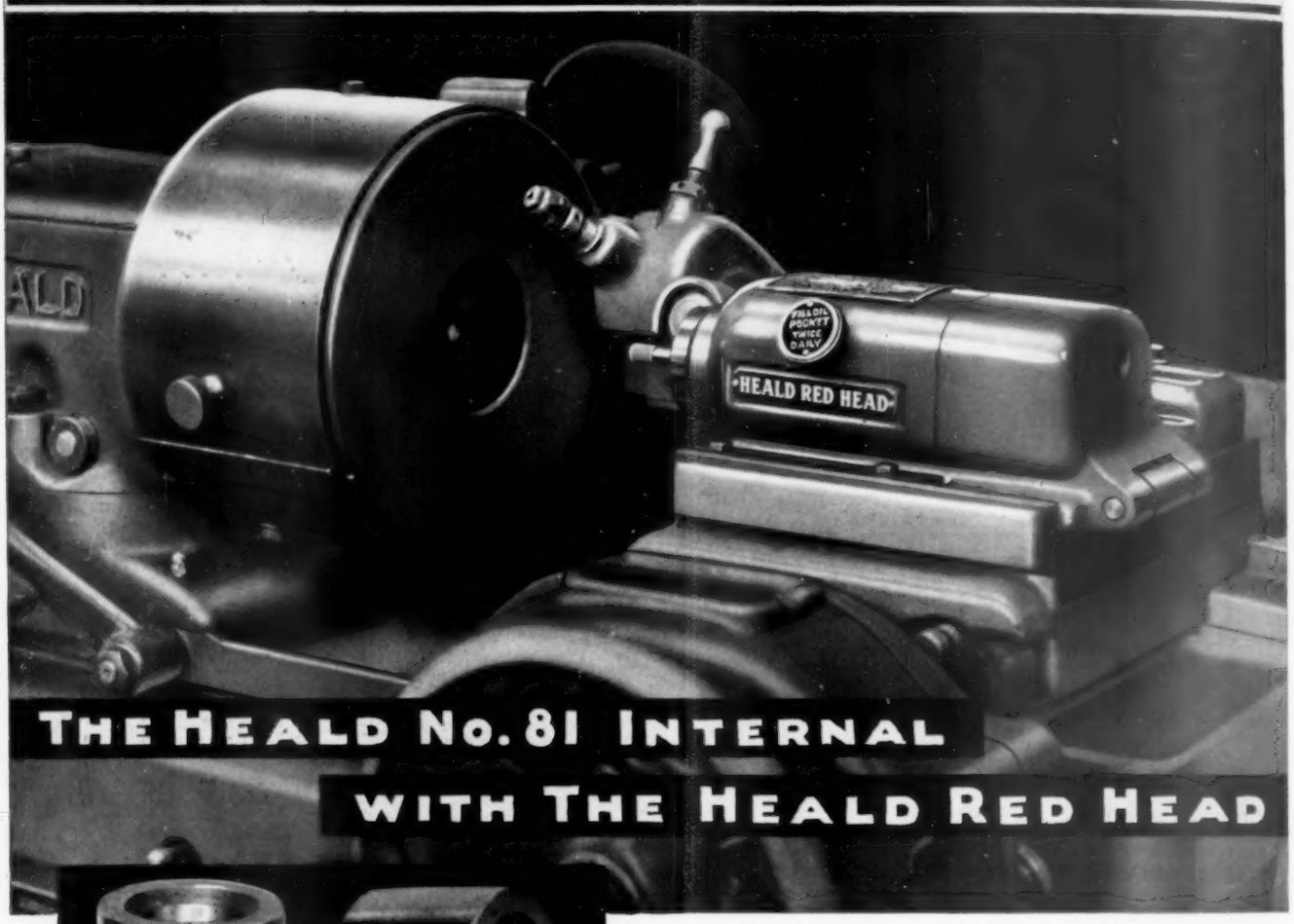

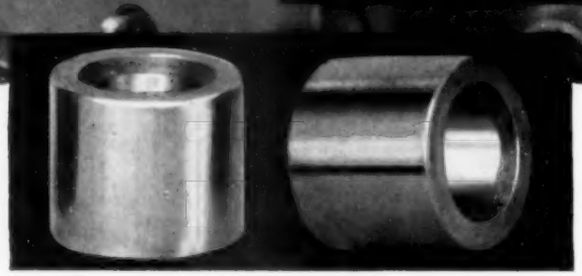

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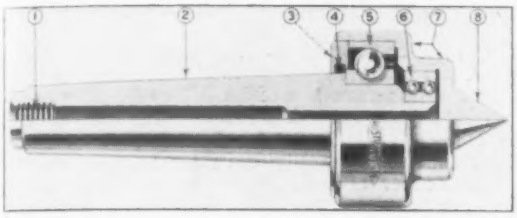

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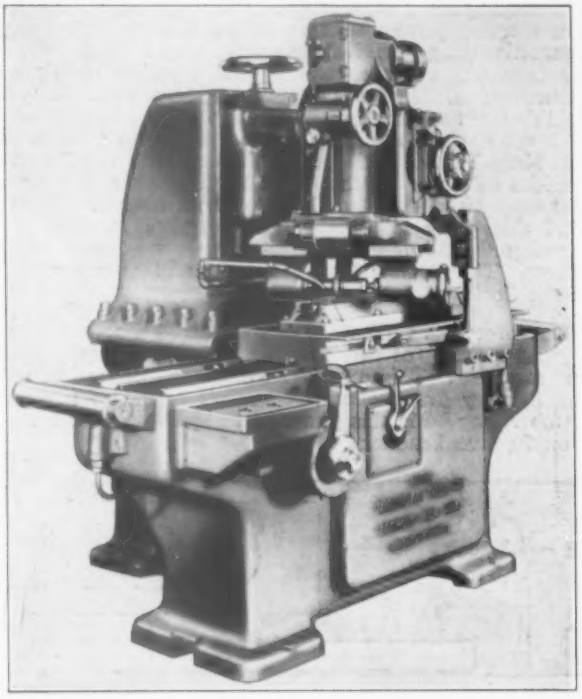

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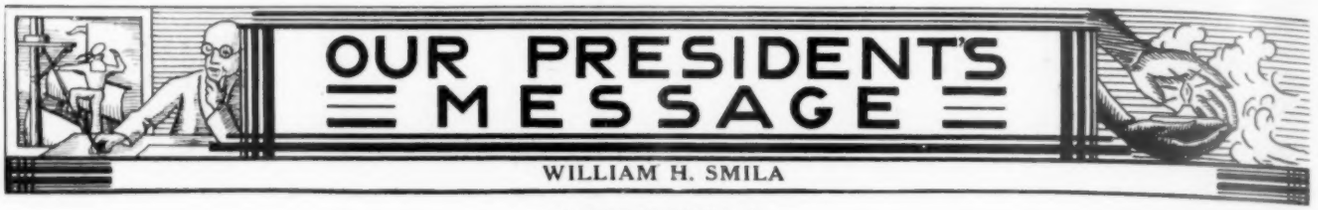


WILLIAM H. SMILA

MEETINGS

ALL regular meetings of the A.S.T.E. are planned and presented by our Meetings Committee. This committee is headed by Mr. Joseph Siegel. They have provided an excellent meeting place and have arranged very interesting and instructive programs. Not only have they arranged the regular meetings but also the special summer meetings and annual picnic. They are now arranging a Keno Party to be held during the month of November. All members, together with their wives, families and friends should plan to attend this Keno Party. This party, like our picnic, will bring our families in closer contact, thereby forming new friendships and strengthening old ones. Every member should get behind this party and make it a complete success, thereby showing the Meetings Committee that we appreciate their efforts. The revenue from this party will go to the treasury of the Society.

Our Meetings Committee has arranged a program for the regular meeting of this month which will be of interest to our members. This program will deal with pattern making and foundry practice, and regardless of how well versed a member may be in this phase of the profession this meeting should prove beneficial.

Owing to a convention with headquarters at the Detroit Leland Hotel being held on our regular meeting date, our meeting for this month will be delayed a day and will be held on Friday evening, November 10th, 1933, at 8:30 P.M. at the Detroit Leland Hotel. This change of dates is for the November meeting only and should not be misconstrued, as the December and all successive meetings will be held on the regular meeting nights. While our Meetings Committee plans to hold all regular meetings at the Detroit Leland Hotel on the second Thursday of each month, still there is always the possibility that, due to the nature of the program or the reservations of the hotel, it may be necessary to change either the meeting place or the date of the meeting. A notice of each meeting is published in the Journal and if our members carefully read this notice they will be informed as to the subject, date, and place of all meetings.

The Meetings Committee has scheduled some very interesting meetings for the next few months, and every member is not only urged to attend, but to invite any friend or acquaintance interested in tool engineering. Arrange your social calendar so that you can attend these meetings and do not forget the Keno Party for this month.

A. M. SARGENT

COMMITTEES' REPORT

THE committees in general have performed their functions through the last month without any particular action which would require special mention. All of them have been active on their regular duties.

The Meetings Committee, under Joe Siegel, has, in spite of obstacles which are covered in the meetings announcement, been able to prepare an exceptionally interesting meeting. They also have plans formulated for a Keno Party, to be held sometime previous to Thanksgiving, later notice of which will be given, that should not be missed by any member.

The Membership Committee, under its new leader, Bill Fors, has stepped in the harness with surprising results. Many dues have been collected through the personal efforts of this committee and a surprisingly large number of new members have been obtained.

The Publications Committee is also having its difficulties this month due to the fact that practically all members of the Editorial Staff are hard-pressed taking care of their various duties and have had little time to give the assistance to Mr. Jones which is necessary. However, they are carrying on, and no doubt this journal will prove to you that their efforts are productive.

JOSEPH KENTSMITH—1869-1933

Joseph Kent Smith beloved member of the Detroit Chapter, American Society for Steel Treating died at Battle Creek, Michigan, the 7th of July, 1933. He was born in Liverpool, England, on the 24th of June, 1869.

Mr. Kent Smith was an internationally known chemist and metallurgical engineer and one of the pioneers in the alloying of steel. In the late '90s he began to work with Vanadium in steel and came to the United States in 1906, having been invited by producers of that element to develop its use as an alloy. He remained for three years, during which time he helped in the forming of the Vanadium Company, now the Vanadium Corporation of America, and the United Steel Company.

He returned to England in 1909 to engage in research with Radium but gave up this task to offer his service to the English Government during the World War and for his work on special alloy steels received, from King George V, the Order of the British Empire; a degree rarely conferred upon a civilian.

Mr. Kent Smith returned to this country in 1925 to assist in the development of a granular iron process and later became a consulting metallurgist for the Climax Molybdenum Company of New York. He aided in the establishment of the research laboratory for that company in Detroit. He was also interested in the development of Beryllium and its alloys.

He was also a member of the British Iron and Steel Institute, American Iron and Steel Institute, the American Society for Testing Materials and the American Institute of Mining and Metallurgical Engineers.

"Requiescat in pace"

"See page 9 for important next meeting announcement."

TOOLS OF BURGLARY

By HENRY L. COLES

THE October meeting of the A.S.T.E. held at the Detroit Leland Hotel was well attended, and the subject "Tools of Burglary," threw a new light on the use of tools to a group who know quite a lot about tools.

Dr. Henry L. Coles, in charge of the department of Chemical Engineering at the University of Detroit and formerly Vice-President of the Mosler Vault and Safe Company, spoke on "Tools of Burglary." A condensed copy of his paper follows:

"I thought that inasmuch as you men had heard all about the wonderful things that metals would do from the Metal Institute for the last week or so, it would be a little relief to get away from that and still keep within the technical side. I certainly ought to know my subject. I spent ten years in the safe and vault industry studying the tax of the burglar and ways to prevent it. I am not going to give a talk. I am simply going to give a few things that I think you might be interested in. It might not be amiss to give a little history of burglary.

"I noticed in the paper several days ago that five robbers held up an up-town New York bank and tossed a tear gas bomb to keep the police and various spectators from joining in pursuit. Modern methods—tear gas bombs. This situation has been going back and forth, from burglary to robbery and robbery to burglary. For fifteen years it has been daylight robbery and the lock and safe protection device manufacturers have believed that they have these 'stick-ups' about stopped. If that is so, the bandit is about ready to change his hours again and go into night work.

"There is nothing new in robbery—nothing new in crime at all. Certainly there is nothing new about thieving and robbery. Up until a hundred years ago, they simply exchanged a sword for a club and a pistol for a sword. However, as time went on, it has gotten to the point where the thier, burglar, and underworld character require their own research. I wouldn't be a bit surprised if some day there is an American Institute of Burglars. Certainly the subject is technical enough.

"The first bank burglary on record occurred at Concord, Mass., in 1865. They picked the key-locking safe and lock and got $310,000.00 in cash and negotiable papers. That was some year! In one bank robbery $310,000.00. Now, the first bank stick-up took place at Liberty, Mo., in 1866. Twelve men rode into town and proceeded to hold up the bank and got away with $72,000.00. At Russellville, Ky., there began to appear the 'advance man' who scouted out the field and found out the banking hours, and so on. In the years around 1870, the James brothers and Younger brothers flourished. They tried to rob a town and thought the way was prepared for them. You will probably read that the James brothers invented train robbery. They didn't invent that any more than Knute Rockne invented foot ball.

"The answer of the safe manufacturer to the picking of locks was the combination lock, and for a while the burglars left the combination locks alone and concentrated on the banks that locked with a key. Finally the bankers decided to put in combination locks and the burglars went into that. You have all probably read of Jimmy Valentine—that would have been a lovely story only there aren't any tumblers to prop, and away goes another fine romance because the modern combination lock is composed of a number of dies with slots in them. The only way possible to solve the combination is to keep on trying and there are only about a hundred million different combinations.

"Now, the burglars have discovered that while they couldn't open the combination locks, the banker could; and in 1870 one conceived the idea of kidnapping the banker and forcing him to open his bank. You have heard stories of that come out in the last year or so That isn't new.

"Well, business thrived for awhile for the burglar. Then James Sargent invented the time lock and bankers in a queer way were slow to take that up. They didn't seem to like the idea of locking their money at night where they couldn't get at it themselves. These time locks were set by means of a clock and the lock could not be opened until the clock released it. However, they gradually took that up and again the advantage was on the side of the banker and the safety vault manufacturer. Drills of harder steels were developed and then they began to drill into the safes and use black powder to blow them open.

"Manufacturers tried dozens of schemes to get around them. For instance, one solution was to fill the safe with salt packing material so that they couldn't get the powder into them. That was a make-shift. Another solution was to fill the safe with water. It was simple to merely bore a hole and let the water run out and then proceed with blowing the safe open. So for a while the burglar had the advantage until manganese steel came along. The safe industry really cleaned up on manganese steel. You are all familiar with the composition of it and anything concerning its properties. It could not be drilled easily. That was followed later by chromium steel and 5-ply steel—which was composed of a layer of chromium steel and a layer of soft steel rolled. It was called 5-ply because there were five different layers. The easiest way to stop drills is to put a layer of hard steel and a layer of soft steel. The advantage then appeared to be on the side of the safe manufacturer.

"In 1880 the so-called yeggman appeared. Now the yeggman began to use dynamite. If he couldn't drill the safe open, he would knock the handle off and introduce the dynamite. You can see that that would really be an easy proposition. That went on until the safe designers designed a new handle that couldn't be turned and tightened up the door jambs. And then happened a curious thing.

"See page 9 for important next meeting announcement."

"The safe-cracker turned to the post-office safes and found them very easy to get in. They still are easy to get in. But that was soon killed. The Government posted a lot of Federal men on the track and as soon as a criminal had finished a term, they brought out a charge of post-office robbery. The criminal often found them waiting for him and he often spent his life in jail. Well, that wasn't such a pleasant thing; so they left the post-offices alone.

"In the last four or five years you have heard of some hold-ups of the postal wagons in Chicago. That was very quickly killed by putting Marines on the wagons. The burglars found that wasn't such a healthy occupation to find the Marines on the wagons. So that burglars, as far as the Government is concerned, are practically stopped. It is perfectly safe—they still use these safes that are easy to open. But they know the money is going to stay in there because no one is interested in spending his life in Leavenworth.

"The burglars were stopped for a while with dynamite until one got the idea of boiling the nitro-glycerine out of the dynamite. You know the properties of dynamite. But I wouldn't advise boiling out the nitro-glycerine. The burglar then proceded to make what was known as the putty-cup on the safe, which is a little cup of putty which is filled full of the glycerine. This is run into the crack in the door and set off with the dynamite. The door comes right out, whether it is a manganese steel door or not. It came out and for a while the safe manufacturers faced starvation and wondered.

"Then they got the idea of the screw door, which screws into the jamb and it is machined down to a very fine fit. These safes have been called burglar proof. For a time they were and that was the answer to the burglar. Screw door safes—so that with hours of boring they couldn't get them out. And it looked as though the advantage was again with the safe manufacturers.

"In 1915 a man by the name of Fushay invented the acetylene torch. If you know very much about welding, you know that the torch cuts through steel—manganese steel, and even cast iron. It just goes right through; and the situation, as far as the safe and vault manufacturers were concerned, was pretty serious. They answered the thing in large vaults by putting in 30, 40, and even 60 inches of solid metal in the doors. The doors alone weighed up in the tons and this question was a real one from the standpoint of design. I could talk rather interestingly on tools for those doors. It isn't easy to burn a way through sixty inches of metal with a torch. You had to get a cone and the greater the outside of the cone the farther around you went until after awhile it would be morning before you got through the door. That wasn't very satisfactory for the burglars or the bankers because it left unguarded many of their safes which they had around.

"Well, the answer to that situation was the copper safe. Copper conducts heat away and the acetylene torch doesn't get thro:gh it. But the burglar doesn't belong to the Union and he drills through the copper and when he gets past the copper he uses his torch. Then it was finally worked out to use high melting point oxide, magnesium oxide, aluminum—the same material used for cutting wheels in shops. The torch doesn't attack those metals. That looked like a pretty good solution until one of the burglar profession happened to stroll into a plant and watch the process.

"When the furnace hole freezes up on the tap, they get a tank of oxygen, a gas pipe and a garden hose; put in the gas pipe—put it in the hole; clear out the tap hole to pour in your steel. This will also burn its way through cast iron. An what is probably just as interesting to you, it will burn its way through brick.

"Well, the burglar found that he could break into a safe of this nature—where in less than forty seconds' time he could have a hole large enough to reach in with a wire and trip up the dog that controlled the lock and swing the door open.

"The answer to that extended over a period of five or six years of research when it was finally decided to get high melting point metals. We chose tungsten. We chose nickel to keep it from burning and added carbon. We had a tungsten carbide. We have the patent on that for everything but tools and General Electric filed the patent for tools. Then that material we cast in an envelope of copper in order to give it strength. In this process we had a solution to the problem which exists at the present time. How long it will exist, I don't know. I know of a method that might go through it, but I am not going to advertise it to the underworld.

"So the answer at the present time, of course, is of that sort, and we will probably see and hear a lot of that after the present cycle of daylight robberies has exhausted itself and goes back to the burglary phase of the game again.

"Now, the night watchmen. Of course, there have been very few burglaries in the last fifteen years and the night watchmen have had rather a dull time. Most of the things they have to deal with are the robberies and gangs from the cities. And again I want to call your attention to the fact that when you take severe measures, as the post-office did, you lessen trouble of that kind. Since 1926 daylight robbery has increased steadily. In 1926 the insurance rate was 45c on the dollar that went to pay losses; in 1927, 78c of every dollar went to pay losses; in 1928, 88c; and in 1930, $1.13. So you see how insurance rates had to go up.

"It is interesting at this point to notice that those States are freest from robberies that have State Police,—because they patrol the roads. The banker is perfectly willing to stand the risk. The insurance companies are tired of doing that. Some of the schemes that have been used are the robbery or burglar alarms. What cashier is going to reach out and touch a button when a man is standing in front of him with a gun pointed right at him? No cashier is getting such a fabulous salary that he can risk their lives that way. Another scheme is the non-toxic tear gas brought in through the chandeliers. Once that settles in to the bank vault, it stays for days and weeks and even months. Then they have bullet-proof glass. Machine guns can cut through bullet-proof glass. The best proposition seems to be the delayed time clock. The bank lock is kept locked until a certain time and they get so much of the opening process done and then they have to wait a half hour to open the door. By that time the burglar may be tired and go away.

"Another 'wrinkle' that has been introduced is to have one of the clerks control a secret alarm to the police station. That has worked out sometimes. But usually the bank people go out and crow about having such a wonderful device in their bank and the wrong people hear about it—the advance men find it out. Then some banks have a chute at

"See page 9 for important next meeting announcement."

the teller's cage, which when opened, will send all the money down the chute into the vault. That is like pressing a burglar alarm. The burglar is liable to get sore and press the trigger. You are not going to take a chance of him doing that.

"You have probably noticed a new development which is the night chute. Those who had money and didn't want to wait until morning to deposit it, would put it into this chute and it would go down into the bank vault and in the morning the teller would credit your account with it. Those were hardly on the market when robberies broke out. The robbers would pour coal down the chute to within a few inches of the top. Then when someone put his money down the chute it would only go down two or three inches and when he had gone, the robber would come and fish it out.

"Something about the future—the repeal of prohibition, I read in the newspapers, is going to bring about the millennium. When it came in we heard crime was going to disappear. Crime increased. After they discovered that, some of the thirsty ones said, 'Now, we will repeal prohibition.' With it will come the throwing out of work of about 50,000 men onto an already serious situation. Just about 50,000 men, bootleggers and highjackers will be out of work and they will go back to daylight work. When Al Capone gets out, he will feel like a small boy with a bow and arrow. He will be lost. We will have to do something about it and we will have to do a great deal like the post-office and the Government have done. We will have to lose our sympathy for criminals and do something severe."

THE GREAT MUSCLE SHOALS

By BYRON W. ORTH

Following Dr. Coles' talk was a most interesting talk on "The Great Muscle Shoals," by Mr. Byron W. Orth of Needs Brothers and Company of Detroit. Mr. Orth dealt with that phase of the "New Deal" which has for its objective the development of the Muscle Shoals Project. We greatly regret that we have not the space to print this fine and worth while paper of Mr. Orth.

NEXT MEETING

NOTICE—On account of a large manufacturing company of Detroit holding their annual convention at the Detroit Leland Hotel on Thursday, November 9th, it was necessary to set our meeting back one day to Friday, November 10, 1933 at 8 P.M. Meeting to be held in main ball room.

"PATTERN MAKING AND FOUNDRY WORK"

Will be the subject presented by two of the most prominent men in the industry; namely—

MR. VAUGHAN REID, president of the City Pattern Works, Detroit, and also president of the National Association of Pattern Manufacturers, who will talk on "Pattern Making."

AND MR. HARRY W. DIETERT, chief engineer of the U. S. Radiator Co. and also president of the H. W. Dietert Co., manufacturers of foundry testing materials, who will talk on "Foundry Work."

Both speakers are members of the executive board of the Detroit Foundrymen's Association and have become nationally known for their contributions to the advancement of the moulding industry. The committee is fortunate and the entire membership privileged to have such authorities come before them with this subject, which, while known to all, is still not fully understood by many.

"See page 9 for important next meeting announcement."

TECHNICAL

JOHN M. CHRISTMAN RAYMOND J. WALTER W. J. McKEEN

DESIGN OF HYDRAULICALLY OPERATED AUTOMATICALLY CONTROLLED, MULTIPLE SPINDLE HEAD DRILLING MACHINE

BY RAYMOND J. WALTER

(Continued)

INASMUCH as we have determined the size of the shaft required and the size of gear to be used, let us follow the spindle through and determine the size and kind of ball-bearing required to perform this particular job.

I might write an entire book on the various requirements needed for ball-bearing application, but I turn to specialists in this particular line whose engineering staff have made a very exhaustive survey of many problems and have determined what is best for each particular line of application. For the following formulas and engineering data herein contained, therefore, I refer you to S.K.F. Engineering.

As pictured in our last article, you will notice that we have placed a single row ball-bearing at the top of the spindle and a double row bearing at the bottom of the spindle. Why? Because at the top of the spindle the only force we have to contend with is the separating tendency of the gears, and gears that transmit power, naturally, exert force on each other at the tooth or teeth in contact. This tooth load is passed directly to the bearings supporting the gears and constitutes an important bearing load. The tooth contact angle is almost invariably 14½° or 20°, the latter being known as the stub tooth. There is always present a frictional resistance to the meshing of the gears and this increases the separating force so it is general practice to add 3° to the pressure angle to compensate for this. In our case, using the 20° stub tooth, our total angle will be 23°.

Power is the result of force times distance through which the force acts, divided by time of action. One horsepower is the product of a force of 1-Lb. acting through a distance of 33,000 feet in one minute, or:

$$1 \text{ H.P.} = \frac{33{,}000 \text{ Ft. X } 1\text{-Lb.}}{1\text{-Minute}}$$

The force in our case is tangent to the pitch circumference of the gear. The distance through which a point on the pitch circumference passes in one revolution is P.D. times *pi*. The pitch circumference passes the point of contact of the pitch circles at the rate of P.D. times *pi* times R.P.M. inches per minute, or:

$$\frac{\text{P.D. X } pi \text{ X R.P.M.}}{12} \text{ Ft. per minute.}$$

The constant force P is applied throughout this distance, hence the power in Ft. Lb. per minute is:

$$\frac{\text{P X P.D. X } pi \text{ X R.P.M.}}{12}$$

To reduce this to horsepower we divide by 33,000, hence:

$$\text{H.P.} = \frac{\text{P X P.D. X } pi \text{ X R.P.M.}}{12 \text{ x } 33{,}000}$$

Solving for P:

$$\text{P} = \frac{33{,}000 \text{ X } 12 \text{ H.P.}}{\text{P.D. X } pi \text{ X R.P.M.}}$$

Cancelling:

$$\text{P} = \frac{126{,}000 \text{ H.P.}}{\text{P.D. X R.P.M}}$$, where P.D. is the pitch diameter of the driving gear.

The twisting moment, or torque Q, is the product of the force P and its lever arm, the pitch radius, hence:

$$\text{Q} = \frac{63{,}000 \text{ H.P.}}{\text{R.P.M.}}$$

In the foregoing example:

$$\text{Q} = \frac{63{,}000 \text{ X } 1.3}{200} = 409 \text{ In. Lb.}$$

P = 409 + 1.8 = 227 Lb. tangential pull at pitch circumference.

The line of action of two mating gears is a line normal to the tooth face of the driving gear at the line of contact of two teeth as they cross the line of centers of the gears. The line of action is tangent to the base circles of the gears. The angle between the line of action and the horizontal center line tangent to the pitch circle is the pressure angle A. The verticle component Pv of the horizontal pull P is, therefore, Pv = P Tan. A.

At the bottom of the spindle we have a double row deep groove radial ball-bearing, because it is economical and efficient for combined radial and thrust loads. When we add a small percentage of thrust load to a deep groove type bearing already carrying a radial load, the maximum load per ball and the stresses on the bearing parts are not increased; they are actually reduced. A radial load is carried on the bottom balls only. The small thrust load which ordinarily divides among all the balls, brings more balls to bear the radial load. For that reason we may add a considerable thrust load (up to 50% at low speeds) without decreasing the radial capacity of a deep groove type bearing.

When the thrust load predominates and the resultant of the thrust and radial loads is more nearly in line with the shaft, the deep groove type bearing automatically adapts itself to the change in direction of the load.

(To be continued)

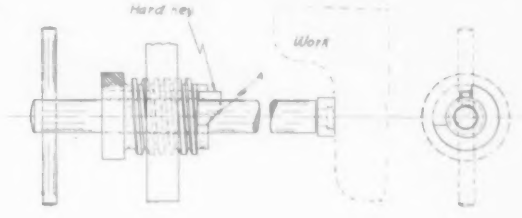
"See page 9 for important next meeting announcement."

NEW TOOLS AND PROCESSES

B. L. DIAMOND HAROLD GILLER

NEW TOOLS AND PROCESSES

THE accompanying sketch and description have been sent to us by Mr. A. Gage, A.S.T.E. member, of Fergus, Ontario. Mr. Gage writes, "I am enclosing a sketch of a quick acting clamp for use on jigs and fixtures. In use, the handle is grasped and the shaft, with key, is drawn back away from the work. The work is removed and a new piece placed in the fixture. The shaft is pushed against the work and turned to the right, the key striking the face of the nut at 'A,' causing the nut to revolve and tighten against the work. The keyway cut through the nut permits the shaft to be drawn back several inches if necessary, thus permitting work with shoulders or protections to be removed from the jig or fixture."



Quick Acting Clamp
AGage.

A LITTLE HISTORICAL NOTE ON GAS WELDING

JAMES B. GIERN*

WHILE attending the interesting A.S.T.E. meeting on industrial welding methods, my thoughts flew back to the fall of 1904 and to an interesting incident in Professor La Cour's laboratory in Denmark—for the professor was one of the fathers, even if not recognized as such, of modern gas welding. His experiments ran about simultaneously with Fouche's, but were entirely devoted to hydrogen-oxygen flames.

It is interesting to note that welding and metal cutting was in a measure a by product of La Cour's work. His main object was to manufacture store-able energy out of wind power, which he converted into electricity. The two gasses were stored in conventional bells, and taken from there for illumination and power purposes.

The good professor was more scientist than practical mechanician and even less of a business man, for he insisted on compressing the oxygen into steel bottles at a pressure of better than one-hundred atmospheres. Just why he persisted in his experiments along this line is a mystery, for the result was not encouraging. At least three buildings went skywards during this work. The least speck of an impurity—a bit of oil or even a little heat, which was unavoidable, would cause the O and the H to explode violently. The pressure used at this writing is about 300 pounds.

The dramatic incident alluded to took place while La Cour was serving on a technical board. The board in a body called on the professor and he took them to the laboratory and showed them many wonderful experiments and of course also his gas welding and cutting.

I remember as though it was yesterday this board, commission, or whatever you might call them. There were a couple of machine builders, some engineers and also business men. I recall their astonishment when La Cour set the flame onto a horseshoe, and while millions of stars shot to all sides reduced it to a gas, cut a piece of iron in two as though he carved a pie, and then welded it together again.

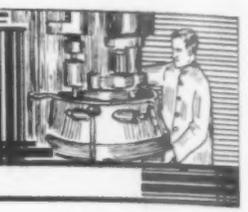
"Gentlemen," he said, "some day this will become a common shop practice." One of the manufacturers (I am glad it was not one of the engineers) smiled in a rather incredulous way and answered, "You are too much of an idealist professor. That method will **never** be practical, it is too dangerous."

The professor is now dead many years—may he rest in peace—yet would he not have experienced an exalted moment if he could have seen that world of welding technic, which he in no mean degree helped create.

*President National Boring Tool Co., A.S.T.E. member.

"See page 9 for important next meeting announcement."

NEW MACHINES



HAROLD GILLER B. L. DIAMOND

AUTOMATIC WELDED STEEL PRESSES

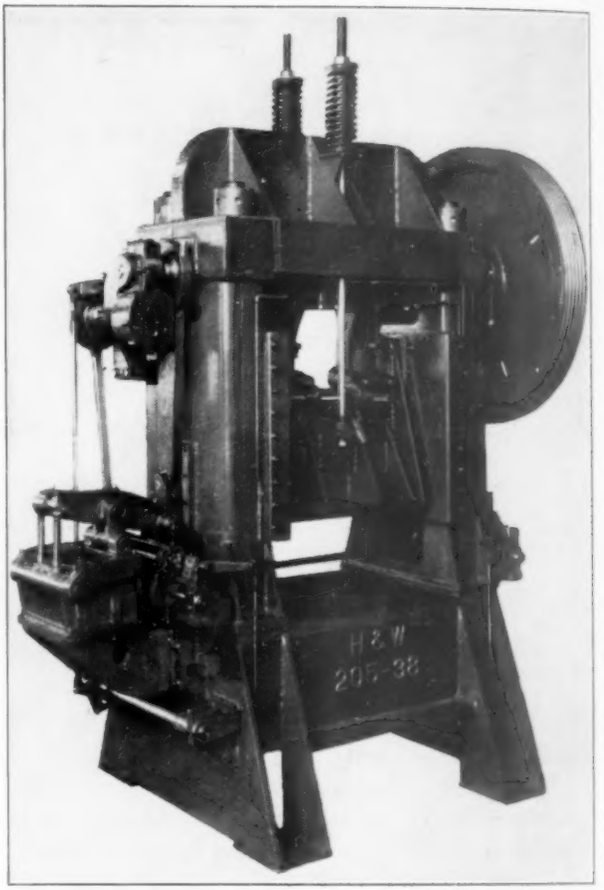
THE Henry & Wright Manufacturing Company has announced the introduction of a line of Automatic Welded Steel Presses, these presses being of welded steel construction and embodying various automatic features typical of the Henry & Wright Dieing Machine.

Presses are of tie rod construction and general design is similar to that of the Company's standard line of welded Steel Straight Sided Presses. Bed, uprights, crown and slide are constructed from special welding quality steel normalized and annealed before machining to release stresses, thus eliminating possibilities of later distortion. Design of these principal members is claimed to be such as to reduce deflection to minimum and to provide high resistance to fatigue.

Crankshafts are made from hammered alloy steel forgings heat treated before finish turning and are mounted in removable hard bronze bushings, crank pin bearings also being bronze bushed. Spring counterbalanced slide, positive clutch, releasing brake, together with single and continuous operating lever, are provided as standard equipment.

Automatic double roll feeds of the type which has been developed over a period of years as standard equipment for the Henry & Wright Dieing Machine (automatic high speed press having crankshaft below bed) are included, these feeds insuring accurate action at high speeds. The hardened rolls are ground to close limits to provide perfect feeding accuracy and are of substantial diameter, thus having ample contacting surfaces. Rolls are actuated through ratchet and pawl mechanism, outgoing rolls being driven from crankshaft through helical gears and driving rack, incoming rolls being driven in synchronism with outgoing rolls by means of connecting rack. Feed pitch is adjustable, and timing of roll feed action with relation to crankshaft rotation can readily be varied by adjustment. Cam actuated roll release mechanism is also included.

Press illustrated has 5" crankshaft and is 38" between uprights. Roll feeds of this press handle material up to 12½" in width, feeds having maximum pitch of 8½". Automatic heavy duty adjustable scrap cutter and provisions for V-belt drive are included.



NEWS OF INDUSTRY

E. R. DeLUIZ

Detroit—William S. Knudsen assumed his new duties as executive vice-president of the General Motors Corporation on October 16th. At the scheduled press conference, it was explained that as a part of his new duties, Knudsen will assume supervision over all car and body manufacturing operations, both in the United States and Canada .

Detroit—A pageant of the part science and industry have played in the advances achieved in motor car building since the advent of the first automobile, is being presented in the national Ford Exposition of Progress, which opened Saturday, October 21st, in Convention Hall. The exposition, which is free to the public, will continue through October 28th.

Portland, Ore.—Another trainload of 1934 model Studebakers, composed of some thirty-six cars, arrived last week for Pacific Northwest key cities via the Union Pacific, and from present indications, will shortly be absorbed by eager buyers.

This is the first trainload of automobiles for this section during the past three years.

Chicago.—The Century of Progress exposition, scheduled to close on October 31st, will be kept open through Armistice Day, it has been announced by Major Lenox R. Lohr, General Manager.

Detroit—Haberkorn & Wood wish to announce the removal of their offices from 2208 West Fort Street to the Machinery Building, 2832 E. Grand Blvd. Telephone: Madison 0132 and 0133.

Detroit—On and after November 1st the Jessop Steel Company will be located at 1300 West Fort Street, Cor. Brooklyn. Telephone Randolph 3152-3.

"See page 9 for important next meeting announcement."

Mr. Floyd B. Petteys, formerly of the Copeland Products Corporation, Mt. Clemens, is now very satisfactorily situated with the Universal Cooler Corporation of this city.

Mr. E. C. Lee, of the Chrysler Corp. (Jefferson Plant), had the misfortune recently, while roaming around in the wooded dells, to break his ankle. We all hope his recovery is rapid so he may throw aside those crutches.

Our Secretary, "Al" Sargent, has two broken toes. Of course, he manages to get around but they are rather painful and he has been warned that Jack Frost may have an opportunity to play around a bit before he is able to wear his shoe again.

Mr. J. K. Wohlfeld, who is a member of the Membership Committee and is now employed at the Buick Motor Car Company, Flint, has been quite active in the various "Buick Organizations." On Thursday evening, October 19th, Mr. Wohlfeld gave a talk before the I.M.A. Literary Club on "Russia" and also "American Engineering in Europe."

Mr. Fred L. Hoffman, of the Packard Motor Car Company, is suffering from an infection in his right hand, which prohibits his using a pencil, and which, by the way is the cause for his not having an article ready for us ths month; but we wll be patient and look forward to te December issue.

The Tool Engineers of the Buick Motor Company held their 17th annual banquet at Moose Hall, Flint, on the night of October 25th, and, as in past years, the affair was a huge success. Entertainment, including six acts of vaudeville, was furnished by the I.M.A., with Max Jones and his Musical Jesters making merry as only the Musical Jesters' five-piece band can make merry.

Promptly at 7:30 o'clock the doors were opened. And before many minutes had passed, the hall was filled to capacity with tired, work-worn Tool Engineers; men who, day after day, had held their noses to that proverbial grindstone. But partly hidden in those weary eyes was an expectant look—like that of a child peeking into its Christmas stocking. Mr. So-and-So greeted Mr. So-and-So in a dignified manner.

Then a musical note, clear and vibrant, and the party was on. Cares of the day, the week, the month and of the past year were forgotten. That well-known amber fluid began to flow in countless streams into countless Schupers. Eatables of every conceivable description. Music. And more music. And soon a spirit of good fellowship prevailed throughout. Now pal greeted pal, enthusiastically, excitedly. They laughed together, drank together, sang together. More amber streams of amber. Vaudeville. And ten-thirty.

And after ten-thirty?

Well—with the attendance still one hundred per cent, an old-fashioned "smoker" was held.

Until the wee small hours of the morning, there was well, let us end there. Surely you have at sometime or other attended such a smoker. So, to eliminate the waste of space, etc., one may use one's own judgment.

The success of the party was such that plans and suggestions already are being made as to next year's fete.

James R. Cavanaugh, Die Designer.

The Detroit Engineering Society offers the following educational courses, some of which may be of interest to A.S.T.E. members.

Law for Architects and Engineers, by Mr. Ben H. Cole, practicing attorney in Detroit. Opening meeting Thursday evening, November 2, 1933, at seven o'clock. Fees: Ten dollars to members of local groups of engineers and architects; twelve dollars to all others.

A Course in Public Speaking, by Mr. Leverett E. Fitts. Open meeting Wednesday evening, November 1, 1933, 7:30 P.M. Fees: Same as above course.

A Review Course in Strength of Materials, by Professor Herman E. Mayrose, College of Engineering, U. of D. Opening meeting Tuesday evening, October 31, seven o'clock. Fees: Six dollars to members of local technical groups, seven and a half dollars to all others.

All above courses will be given at the Detroit Engineering Society Building, 478 West Alexandrine Avenue.

A Metallurgical Lecture Course covering production, fabrication, treatment, testing and application of iron and steel is being presented by the Detroit Chapter of the American Society for Steel Treating. The course will cover a period of three years, and is open to all members, juniors and sustaining members of the A.S.S.T. Every sustaining member has the privilege of nominating three people to attend these lectures. The next lecture in the course will be given by Mr. O. W. McMullan, of the Timken-Detroit Axle Company, November 6, 1933, eight P.M., at Detroit City College.

"See page 9 for important next meeting announcement."

CO-OPERATION

By ALLEN H. MOGENSEN

CHAS. F. KETTERING, in charge of General Motors Research, has said many times that the whole fun of living is in trying to find a way to make something better. How many people in the plant secure their fun in this manner? Isn't it the truth that most of them secure the greatest pleasure in showing somebody else where they are wrong? Have you not seen instances where a man felt tremendously elated merely because he was able to show somebody else that an idea was no good?

There has been entirely too much of this attitude in industry, and this feeling has been responsible for much retardation of progress. Especially in the field of motion and time study is this true. Many a plant man takes considerable delight in showing the analyst that all his ideas are worthless and that it is absolutely foolish for a mere youngster to attempt to come in and show a man who may have been in that department twenty years how to run his job. Again there is no question that the attitude of many of those undertaking motion and time studies has been at fault. The need is for an attitude of cooperation—working the problem out together with the shopman rather than the assumption of the air of an expert.

The job in industry, then, is to assemble the intelligence of the plant. Probably one of the worst things that the functional type of management has done is to foster the feeling throughout industry that once set up, it no longer required any thinking on the part of the operating force. We have all seen this time and time again. Workers, foremen and actuallyq production heads have resented the establishment of divisions formed to administer production control, time study or various other staff services. They assume at once that these engineers will do all the thinking and this, of course, is immediately fatal. There is no doubt that this lack of cooperation, and not the fault of the functional plan in itself is entirely responsible for the big swing toward the foreman-manager type of operation, and the curtailment or elimination of many of the functional set-ups in industry. We cannot ignore this definite swing toward simple straight-line production, or product control as against the process type of control.

If, therefore, motion and time study is to be successful, we must have an open mind on the part of management, an open-minded shop organization. Methods engineers, above all, must have this viewpoint.

One example of this has been in the practice of time-study departments to justify their existence by elaborate reports showing the amount saved monthly or annually on individual jobs. There is no doubt that many managements still require actual proof of the value of such activities. However, some motion and time-study engineers have found it has paid handsomely to be generous with the showing of savings, giving as much credit as possible to the foreman whose cooperation has made them possible. Reporting to the management that Bill Jones in the screw-machine department had discovered a way to greatly reduce handling costs of rod stock might, perhaps, be giving Bill more credit than he really deserves, but it is surprising to see how much cooperation the engineers obtain the next time they enter his department.

Another place where cooperation pays big dividends is in the direct relations with the worker. Too many suggestion systems in the past have been definitely set up on the basis of extreme secrecy. We have assured the worker that under no conditions would we inform his supervisor if he had made a suggestion. Various schemes for numbering the suggestion blanks attest to this procedure.

There is no doubt that many of these suggestion plans will be entirely scrapped when an organization becomes motion-minded. It is not theory that once a group actually gets thinking along the lines of motion economy, many more suggestions are offered than one committee could possibly attempt to handle. It is this sort of thing that brings a man closer to his foreman, the foreman closer to the superintendent, and we finally have the motion and time-study engineer acting more or less in the capacity of the consultant.

The greatest opportunity for elimination of waste—waste of time, energy and material—will only be realized when full cooperation is secured between top management, supervision, the workers and the men making the methods studies.

"See page 9 for important next meeting announcement."

REPORT OF LAST MEETING

MR. Harry Trevelyan, of Packard Motor Car Company, gave a brilliant talk on Gages, Their Design and History, at the September 28th Junior meeting. Space forbids our printing the complete paper, but in the following resumé we shall endeavor at least to bring out the high spots of a most interesting and instructive paper.

"What is a gage? Webster says, "A measure; a standard of measure; an instrument to determine dimensions, distances, or capacity. Rather a wide range, is it not, for it means that 'gage' covers your opinion and knowledge of persons, dimensions, place, quantity and quality, and any other characteristic of every thing on this earth, whether measured by instruments or otherwise.

"We shall now consider gages used to check linear and cubical measurements, their history and origin, and we are going back so far that the subject sounds like a fairy tale. A survey of ancient history shows that linear dimensions came first. The most ancient type of man which the scientist will say was akin to us, existed in China, about one million years ago. The evidence found consists of a collection of human bones, some partly burnt stones and animal bones, and some natural stones showing fossil evidence of having been used as tools, specifically, as hammers. No gages were needed in connection with these tools. Thousands of years later, perhaps about fifty-thousand years ago, came another race of people, the Neanderthal race. The rough, uncouth looking Neanderthal Man, who, according to H. G. Wells, was of the original of the ogre in folk-lore and children's stories, established the first **gage** of morals, and recognized the rights of wife and children. In addition these people buried their dead. No linear or cubical gages had appeared as yet, but there are plenty of unformed stones showing evidence of having been used as tools, and even crude evidence of the sling and bow.

"Next, we have a race of people, who flourished from 25,000 to 35,000 years ago, whose history is known not only from fossil or similar remains, but from actual sculpture and other crude art work. These Cro-Magnon people have left cave-wall sculptures and paintings which rival, in accuracy and fine proportions even the works of modern artists. At Cap Blanc, in France, is a row of sculptured horses, showing absolute perfection of form. The Cro-Magnon man must have developed some tool for cutting sculptures, probably of some kind of stone harder than the stone used for artistic purposes, but still capable of being chipped and shaped. We have still no evidence of gages, although there are remains of foot-prints showing a measurement for length made by human feet, heel to toe. And we also know that these people had still further developed the gage of morals, because their remains show the development of family life, and the grouping of families into tribal life.

"We now come to a race of people called the Neolithic, or New Stone Age group. The remains of their period of existence are found all across Europe and Asia. They knew how to chip stone implements, made clay pots for cooking and storage, made fish-nets, had some cultivated plants, and domesticated animals. They also probably erected those immense collections of monoliths found in England, France. These stone erections are invariably set up so that the altar will, with the two rows of stones, face the East, or run due East and West. These monoliths are evenly spaced, so that we must believe that they were constructed wtih the aid of some linear measuring device other than the heel and toe measurements of the Cro-Magnon man. The Neolithic man chipped flints to make arrows and spear points which are equal in workmanship to any of those made by our Indians. He also had abandoned the nomadic life and settled in villages, started to grow crops, raise cattle and sheep, catch fish by mechanical means, and knew the advantages of a formed stone over a natural stone. The Neolithic man also had an understanding of the movement of the sun, which is the father of all time and directional gages, and the master to which they are checked.

"We now arrive at a period starting about eight thousand years ago. We have a few Egyptian records to guide us, and it is to the Egyptians that we are indebted for the first descriptions of measuring rods, the plumb, square, and level, and possibly their invention. Their first tools were of stone, changing gradualy to bronze, and finally to iron before their ascendancy waned. Unfortunately, while there are millions of their stone and bronze tools and weapons in existence, very few of their gages remain. The reason, prob-

"See page 9 for important next meeting announcement."

ably, is that very few were made, because only those in charge of the work were entrusted with the use of the square, level and plumb to determine the dimensions. However, I have seen a few specimens of their gages in museums. They were made from a natural bronze, and they seemed to be as accurate as a carpenter's square of to-day.

"The ruins of Egyptian temples show a strict regard for proportion and detail, only to be attained by systematic measurements and the use of standards. Because of the yearly overflow of the Nile, it was necessary to make a survey of their country every year to determine property boundaries. This made of the Egyptians expert surveyors and mathematicians, and to them we owe geometry and with it the basis for our own science in tool and gage work. The Greek Euclid collected the known geometry of his time in book form. The celebrated proposition concerning the square on the hypotenuse of a right angled triangle is the basis of practically all the angular measurements we make today and is the foundation of trigonometry. Euclid gave his country-man Pythagoras credit for first providing this theorem, but Pythagoras stated that it had been in use by the Egyptians from time unknown in surveying their land boundaries. We have now arrived at the time when measuring rods, squares, plumbs, levels, measures of area and capacity, and angular meaurements were as far advanced as they were to be for hundreds of years.

"Next came the Phoenicians, Greeks, and Romans. While all these people were industrious builders, they added little to the development of tools, with the notable exception of the dividers.

"We have now reached the end of the ancient period, and there was practically no more progress for hundreds of years. The use of standard weights and measures enforced by the Romans was discarded as soon as the Roman influence ended. Under the Roman influence there had been a complete system of weights and measures, with government controlled standards, and heavy penalties were visited upon deviations from these standards. Yet, in the short space of one-hundred years, all this work vanished as far as the average person was concerned, for with the invasion of the Germanic tribes civilization actually disappeared in some sections. These invading tribes had no measurements. However, they were excellent smiths, probably because the principal metal found in their original homes, in Europe, was iron, and, as we all know, iron is much harder to work than the copper or bronze used by the Romans.

"These tribesmen eventually settled down, however, and in England there are still on record deeds showing the measurements used to specify acreage. One such deed calls for the conveyance of a piece of land that a team of horses can plow one furrow around in one day. Many deeds call for the conveyance of a 'hide' of land, and a 'hide' was the surface of land that could be encompassed by the hide of a full-grown bull when cut into strips and tied together.

"One of the only bright spots in the period between the year 500 and about the year 1300 was the continued existence of a few of the crafts guilds. These guilds, organized from very early times, continued through the Dark Ages and maintained the skill of their ancient brethren, and also their standards of measurement. Indeed, our systems of Troy and Apothecaries' weight in use today, can be directly traced back to the Goldsmith's and Apothecaries' Guilds. Measures of length were kept alive by the Masons' Guild, and this Guild also had much to do with preserving the Science of Geometry.

"Because of lack of contact between the various Guilds, great divergencies as to standards of weights and measures came about. By 1324 the situation had reached the point where every man who had anything to sell had his own standard. To remedy this condition the English Parliament passed an act defining a foot as the length of '36 barleycorns round and dry,' and a yard as three feet. An iron bar showing the length of this yard was made. This first standard has disappeared, but about 1490 a new standard was made which is still in existence. It is a simple iron rod, ½" by 1" in section, and is actually 36" long—if you are not too particular.

"The present standard yard of Great Britain was legalized in 1855. It is a line measure of bronze with the graduations on gold plugs set in wells. Many of these standards were made, and one has been used as the U. S. standard since 1855.

"Now for the Metric system. The original plans provided that the unit of length, the meter, should be one-ten-millionth of a quadrant of the earth's meridian through Paris. Careful surveys were made, and a standard, called the Meter of the Archives was constructed. Later surveys showed that this standard was not correct, but it was decided to copy it as an arbitrary standard.

"The meter therefore has an arbitrary value, as has the yard, and for this reason the American and British Governments have officially defined the value of each in terms of the other. These values are as follows:

American—1 Meter = 39.37"
1 Yard = .914402 Meters.

British—1 Meter = 39.3701 +"
1 Yard = .914399+ Meters.

"All governments (including the U. S.) except the British have declared the Metric system to be their official system, and the British have standardized their linear unit by the Meter.

"The condition we find is this: The Metric system is in universal use by scientists and by manufacturers and mer-

"See page 9 for important next meeting announcement."

exists only partially. Why this should be is difficult to determine, but is probably due to custom and the enormous expense of making a change.

"It is interesting to consider the origin of the names of our measures. The word 'inch' comes from the Anglo-Saxon, and originally meant a twelfth part. The meaning of 'foot' is obvious. The word 'yard' comes from the Old English 'Gerd' and is found in all the Nordic languages with but slight variations in spelling. It originally meant a goad, or the stick used for driving oxen.

"The standardization of the Meter and the Yard mark an advance that is probably the greatest since man first started to use gages.

"But in the use of gages as we use the term, little or nothing was done until about 1900. Government arsenals and gunmakers before this had used plugs and a few profile gages, but mainly for reference. Even as late as 1908 a gage was somewhat of a curiosity and was used only when absolutely necessary.

"In 1914 we all started to make war supplies, and we came to know munitions makers from all over the world. We came to know their gaging systems also and we promptly adopted the best part of them when we went back to making automobiles."

As the more recent history of gages is well known by every tool designer and tool engineer, we shall break off Mr. Trevelyan's excellent and scholarly paper at this point, regretting that we lack space to print the paper in its entirety.

Depends on the Dog

A very small boy was trying to lead a St. Bernard dog up the road.

"Where are you going to take the dog, my little man?" inquired a passerby.

"I'm—I'm—going to see where he wants to go first," said the boy—Star (Montreal).

Give Mary Time

Mistress—Your young man is very quiet, Mary. We never hear a sound of him when he's in the kitchen.

Maid—Well, ma'am, I haven't known 'im very long, and so far 'e does nothing but sit and eat all the evening!—Humorist (London).

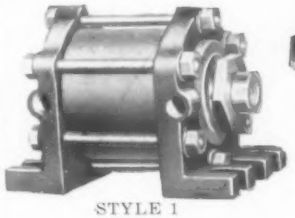
"HOPKINS" PREFERRED EQUIPMENT

"QUALITY AND SERVICE"
IS THE SLOGAN FOR

HOPKINS —— NON-ROTATING
DOUBLE - ACTING CYLINDERS

AIR OR HYDRAULICALLY
OPERATED.

IN ALL
DESIRED
CAPACITIES.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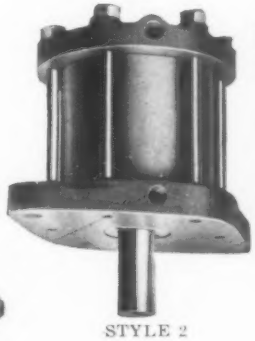
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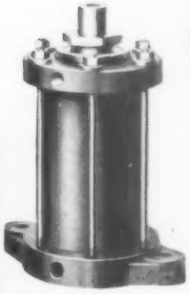
STYLE 3


STYLE 4


STYLE 5


STYLE 6

Below—Style 2 Cyl. Cushioned on Both Ends

All Styles—
May be furnished
cushioned on both ends
or on either end.

DETROIT REPRESENTATIVE
HABERKORN & WOOD

THE TOMKINS - JOHNSON CO. 624 No. Mechanic St. Jackson, Mich.

THE "BAIRD" 11 inch, 8 SPINDLE, AUTOMATIC, INTERNAL, VERTICAL GRINDER

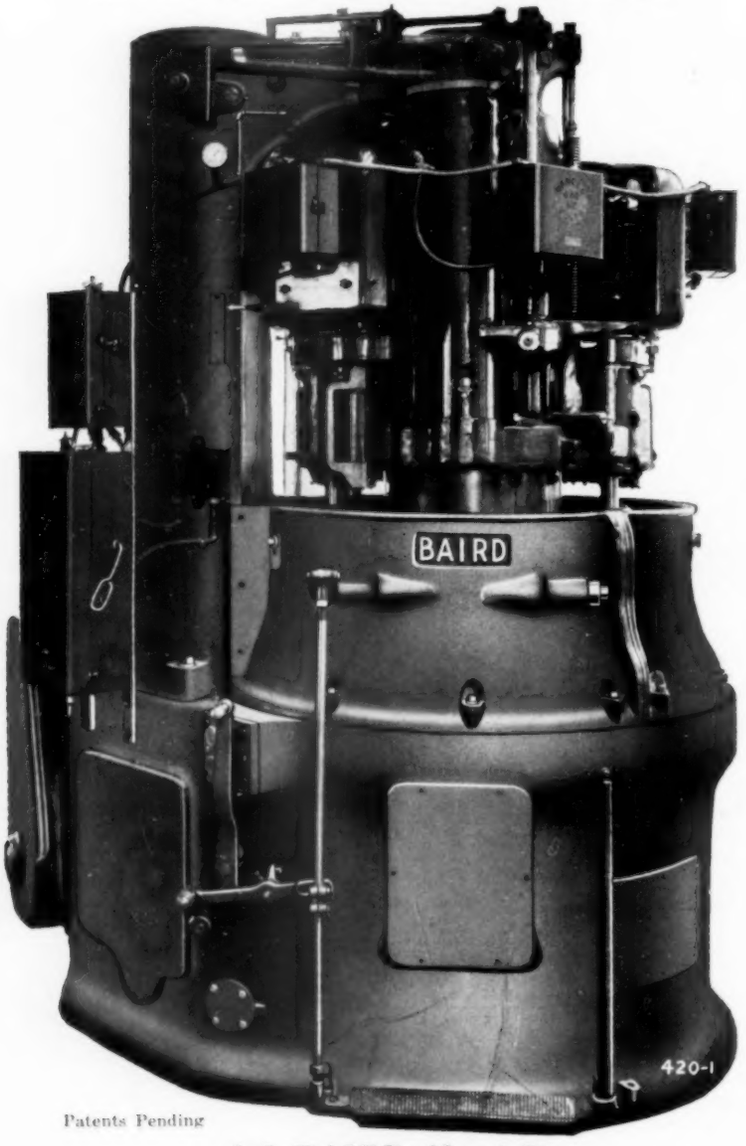
Each Wheel Individually Dressed and Sized to Suit Conditions at Its Station Without Change at Any Other Station

Machine may be set up ***Double Indexing*** and work passed through the first time for one size of hole at one end then immediately reversed in the holding fixtures and passed through the machine a second time to grind a different size of hole in the other end or two pieces may be passed through at the one time.

Each wheel may be changed or adjusted quickly and independently of any other wheel.

The size and kind and speed and amount of feed of each wheel and the amount removed from each wheel in dressing it, is entirely independent of these factors for any other wheel.

AN EXCLUSIVE BAIRD METHOD.



Patents Pending

Wheels do not have to be all of the same size even for the same hole.

Two different diameters of holes may be ground in the same pass through the machine.

Machine will operate within the tolerances allowed for in production of high grade machine parts or parts for automobiles, motors, ball and roller bearings, refrigerators, sewing machines, bushings, &c., &c.

The machine is provided with automatic mechanical chucks, automatic safety controls, automatic lubrication, enclosed mechanism, anti-friction bearings, individual motor drives for the wheel spindles and is built accurately to stay accurate.

Send samples and/or prints of any parts you have to grind, state quantities to be handlel in a given time and our engineers will be glad to make a study of your work and make a report and without obligation.

Ask BAIRD About It.

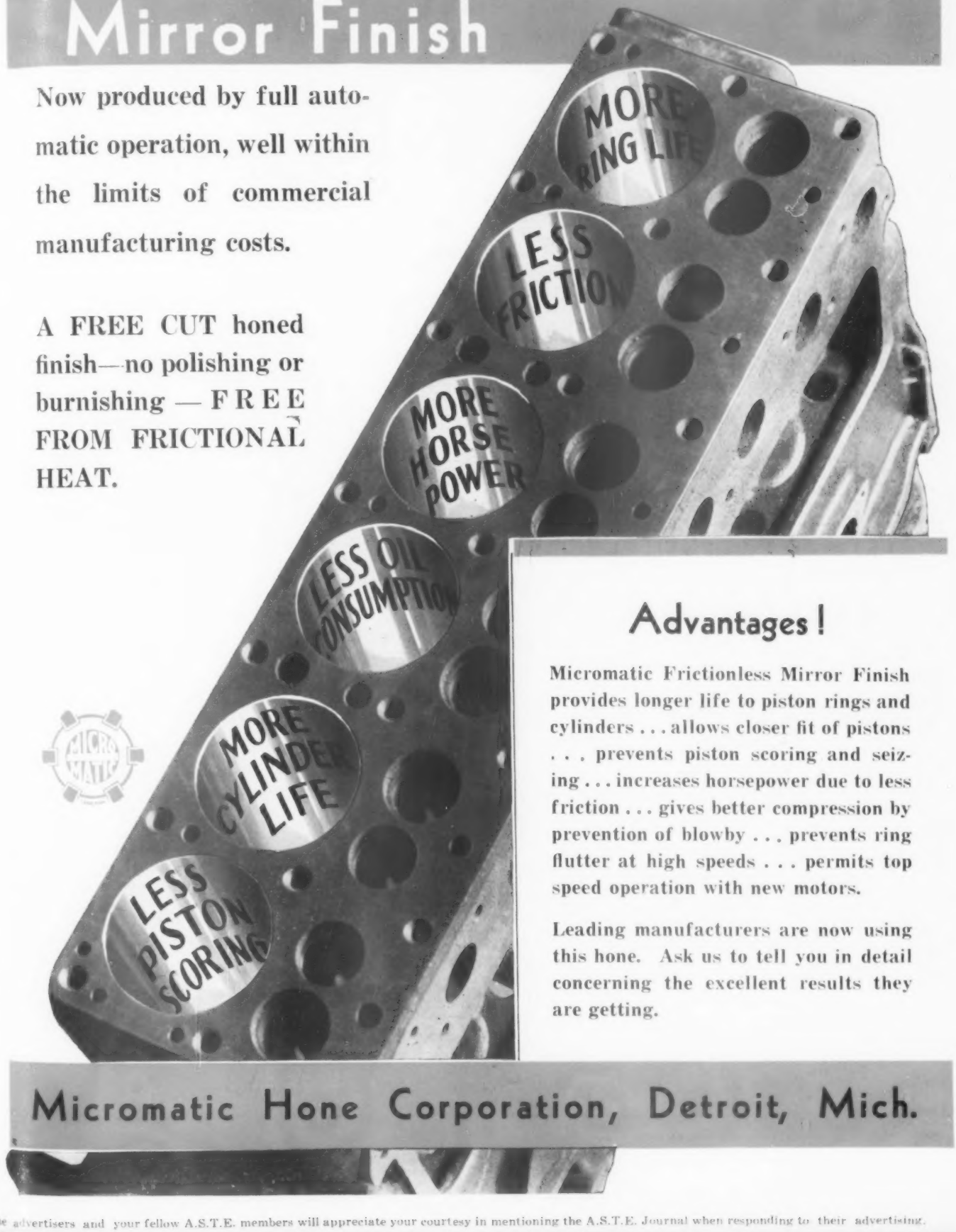
THE BAIRD MACHINE COMPANY

Bridgeport Connecticut

Reflections of Micromatic Frictionless Mirror Finish

Now produced by full automatic operation, well within the limits of commercial manufacturing costs.

A FREE CUT honed finish—no polishing or burnishing — FREE FROM FRICTIONAL HEAT.



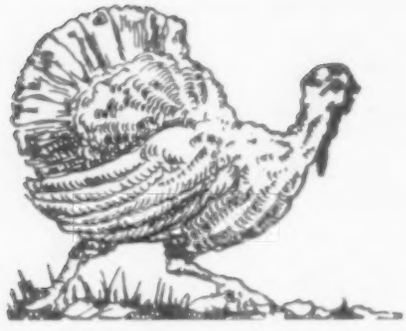
Advantages!

Micromatic Frictionless Mirror Finish provides longer life to piston rings and cylinders . . . allows closer fit of pistons . . . prevents piston scoring and seizing . . . increases horsepower due to less friction . . . gives better compression by prevention of blowby . . . prevents ring flutter at high speeds . . . permits top speed operation with new motors.

Leading manufacturers are now using this hone. Ask us to tell you in detail concerning the excellent results they are getting.

Micromatic Hone Corporation, Detroit, Mich.

The advertisers and your fellow A.S.T.E. members will appreciate your courtesy in mentioning the A.S.T.E. Journal when responding to their advertising.



THE SEASON'S FUN

The Meetings Committee is arranging for a Fall social evening in the nature of a Feather Party, which will be held later in the month, the date and place of which will be announced at the meeting on Nov. 10th, and likely later by card. So-o-o-o first--come to the meeting and get the dope, then hold that date open for Keno and the trimmings. Oh yes, indeed! the ladies are most cordially invited, and members are asked to invite their friends.

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